National Institute of Environmental Health Sciences

Climate change in Brazil: Perspective on the biogeochemistry of inland waters

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Abstract:

Although only a small amount of the Earth's water exists as continental surface water bodies, this compartment plays an important role in the biogeochemical cycles connecting the land to the atmosphere. The territory of Brazil encompasses a dense river net and enormous number of shallow lakes. Human actions have been heavily influenced by the inland waters across the country. Both biodiversity and processes in the water are strongly driven by seasonal fluvial forces and/or precipitation. These macro drivers are sensitive to climate changes. In addition to their crucial importance to humans, inland waters are extremely rich ecosystems, harboring high biodiversity, promoting landscape equilibrium (connecting ecosystems, maintaining animal and plant flows in the landscape, and transferring mass, nutrients and inocula), and controlling regional climates through hydrological-cycle feedback. In this contribution, we describe the aquatic ecological responses to climate change in a conceptual perspective, and we then analyze the possible climate-change scenarios in different regions in Brazil. We also indentify some potential biogeochemical signals in running waters, natural lakes and man-made impoundments. The possible future changes in climate and aquatic ecosystems in Brazil are highly uncertain. Inland waters are pressured by local environmental changes because of land uses, landscape fragmentation, damming and diversion of water bodies, urbanization, wastewater load, and level of pollutants can alter biogeochemical patterns in inland waters over a shorter term than can climate changes. In fact, many intense environmental changes may enhance the effects of changes in climate. Therefore, the maintenance of key elements within the landscape and avoiding extreme perturbation in the systems are urgent to maintain the sustainability of Brazilian inland waters, in order to prevent more catastrophic future events.

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Resource Description

Exposure :

weather or climate related pathway by which climate change affects health

Ecosystem Changes, Food/Water Quality

Food/Water Quality: Biotoxin/Algal Bloom

Geographic Feature:

resource focuses on specific type of geography

Freshwater

Geographic Location: ☑

resource focuses on specific location

Non-United States

Non-United States: Central/South America

Health Co-Benefit/Co–Harm (Adaption/Mitigation): ☑

specification of beneficial or harmful impacts to health resulting from efforts to reduce or cope with greenhouse gases

A focus of content

Health Impact: ☑

specification of health effect or disease related to climate change exposure

Infectious Disease

Infectious Disease: Foodborne/Waterborne Disease

Foodborne/Waterborne Disease: Marine Toxin Syndrome

Mitigation/Adaptation: ☑

mitigation or adaptation strategy is a focus of resource

Adaptation, Mitigation

Model/Methodology: ☑

type of model used or methodology development is a focus of resource

Exposure Change Prediction

Resource Type: ☑

format or standard characteristic of resource

Review

Timescale: ☑

time period studied

Long-Term (>50 years)

Vulnerability/Impact Assessment: ☑

resource focus on process of identifying, quantifying, and prioritizing vulnerabilities in a system

A focus of content